An assessment of the CFSv2 real-time seasonal forecasts for 2011-2013

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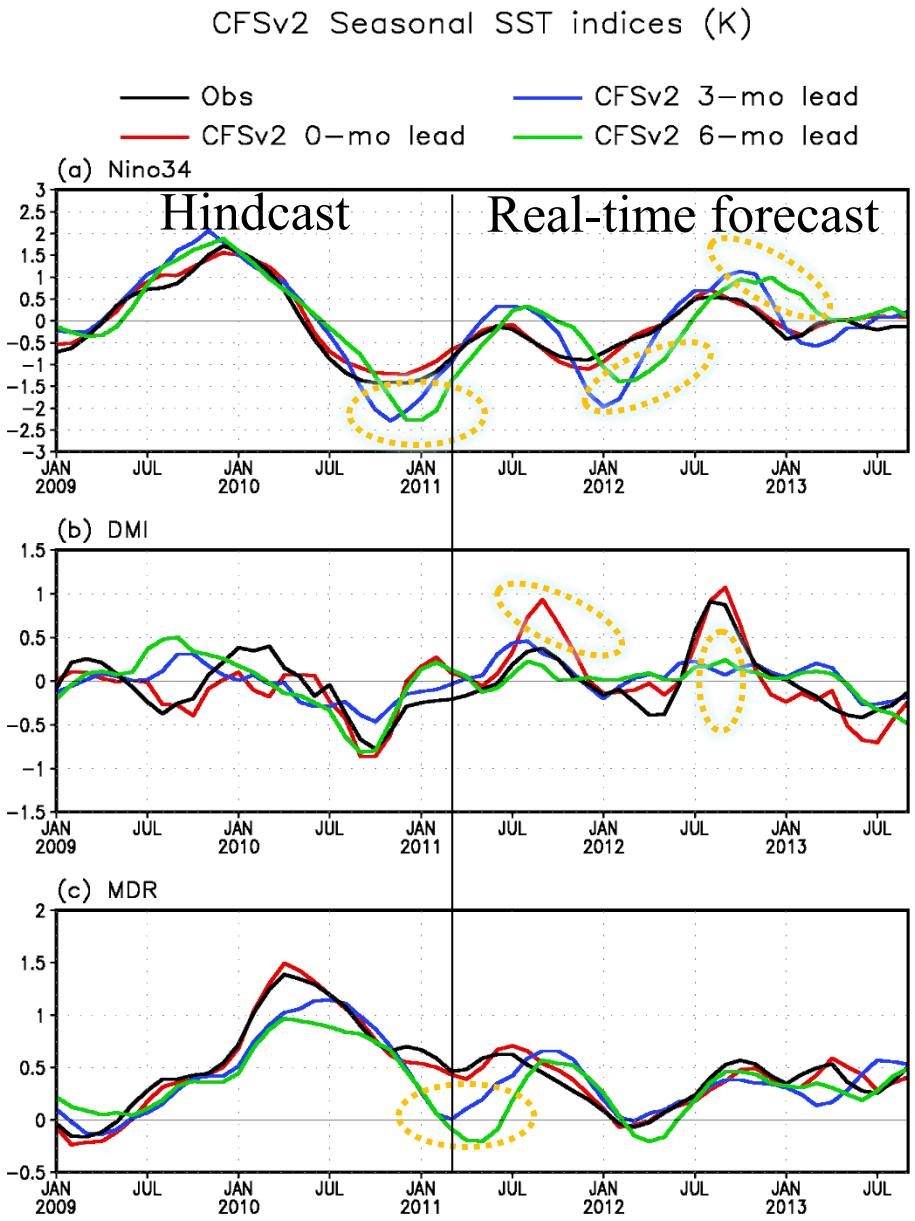
CPC/NCEP/NOAA

Outline

1. **Tropical SST**
2. **Northern Hemisphere precipitation and T2m**
3. **Arctic September sea ice extent**

1. Tropical SSTs

SST indices



Nino34

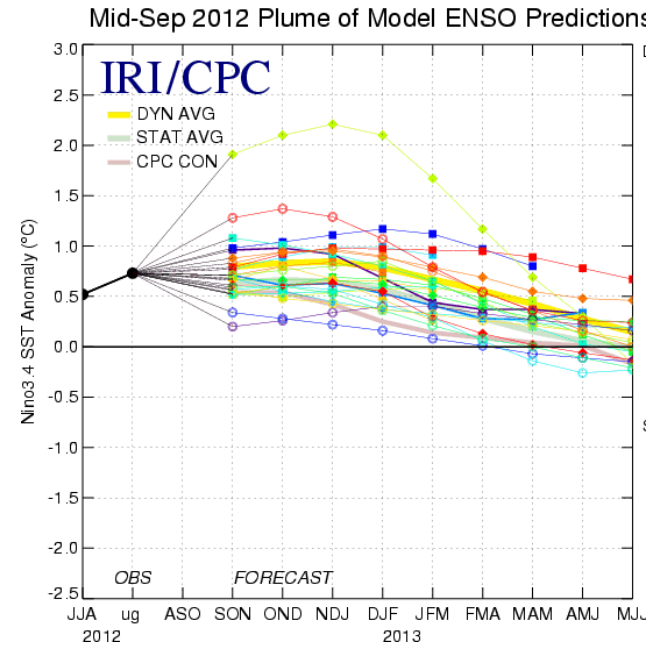
- Stronger amplitude of both positive and negative phases
- Delayed transition of ENSO phases at longer lead-time

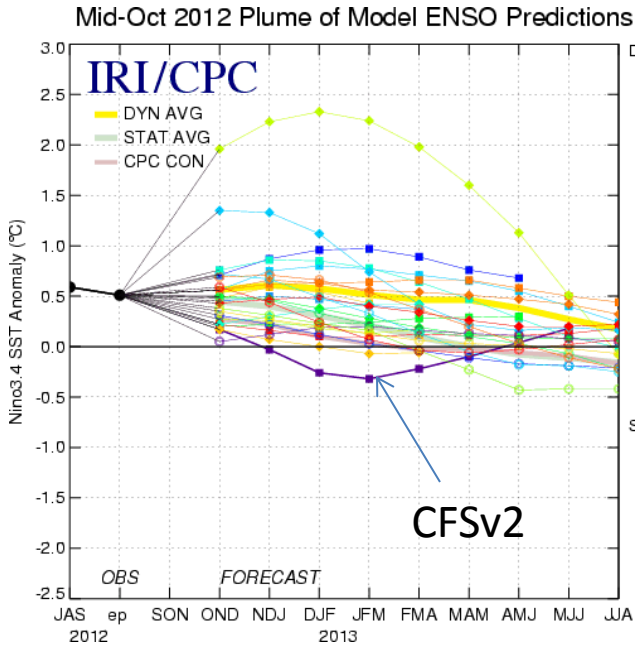
DMI

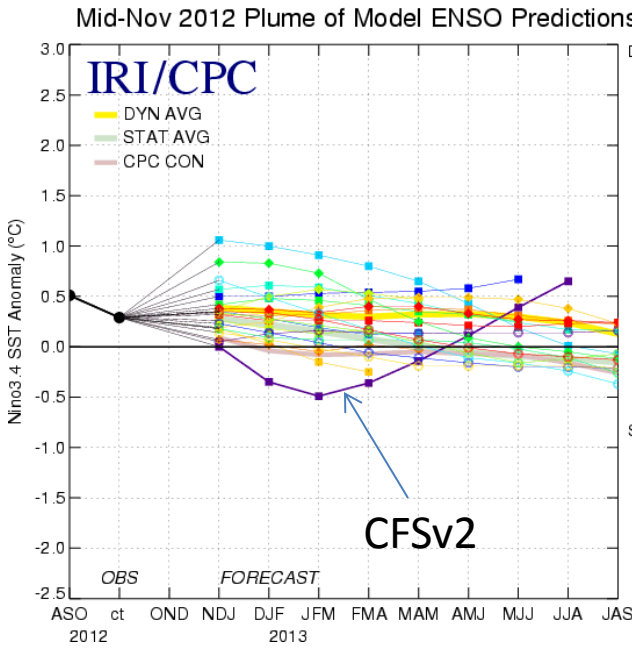
- Possible initialization problem in 2011 Summer.
- Failed to reproduce positive DMI in 2012

MDR

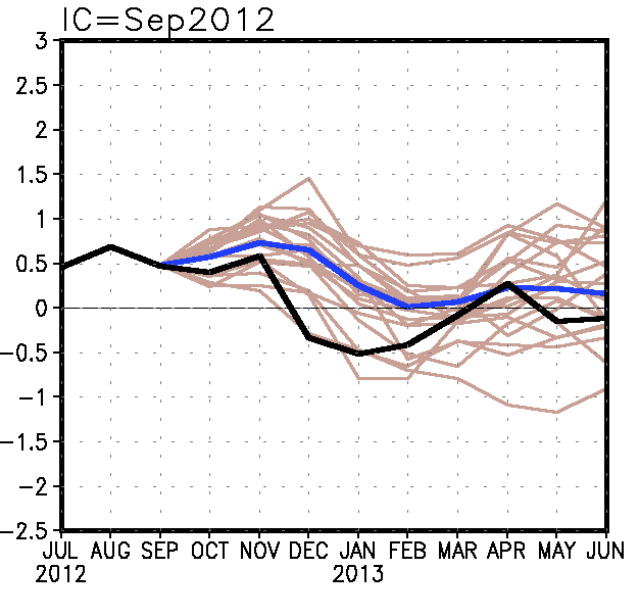
- Underestimate the amplitude of warm anomalies during Jan-Jul 2011

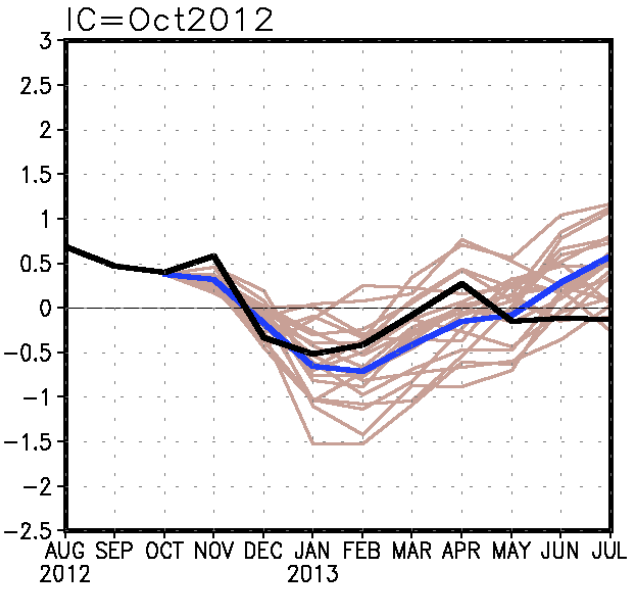


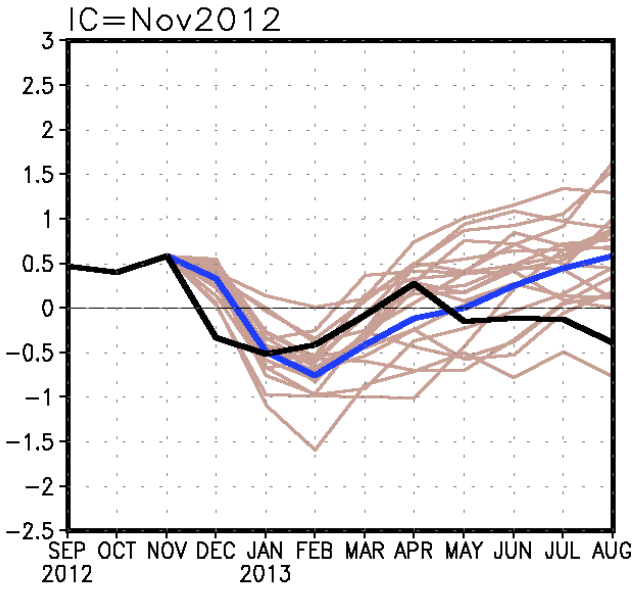




CFSv2

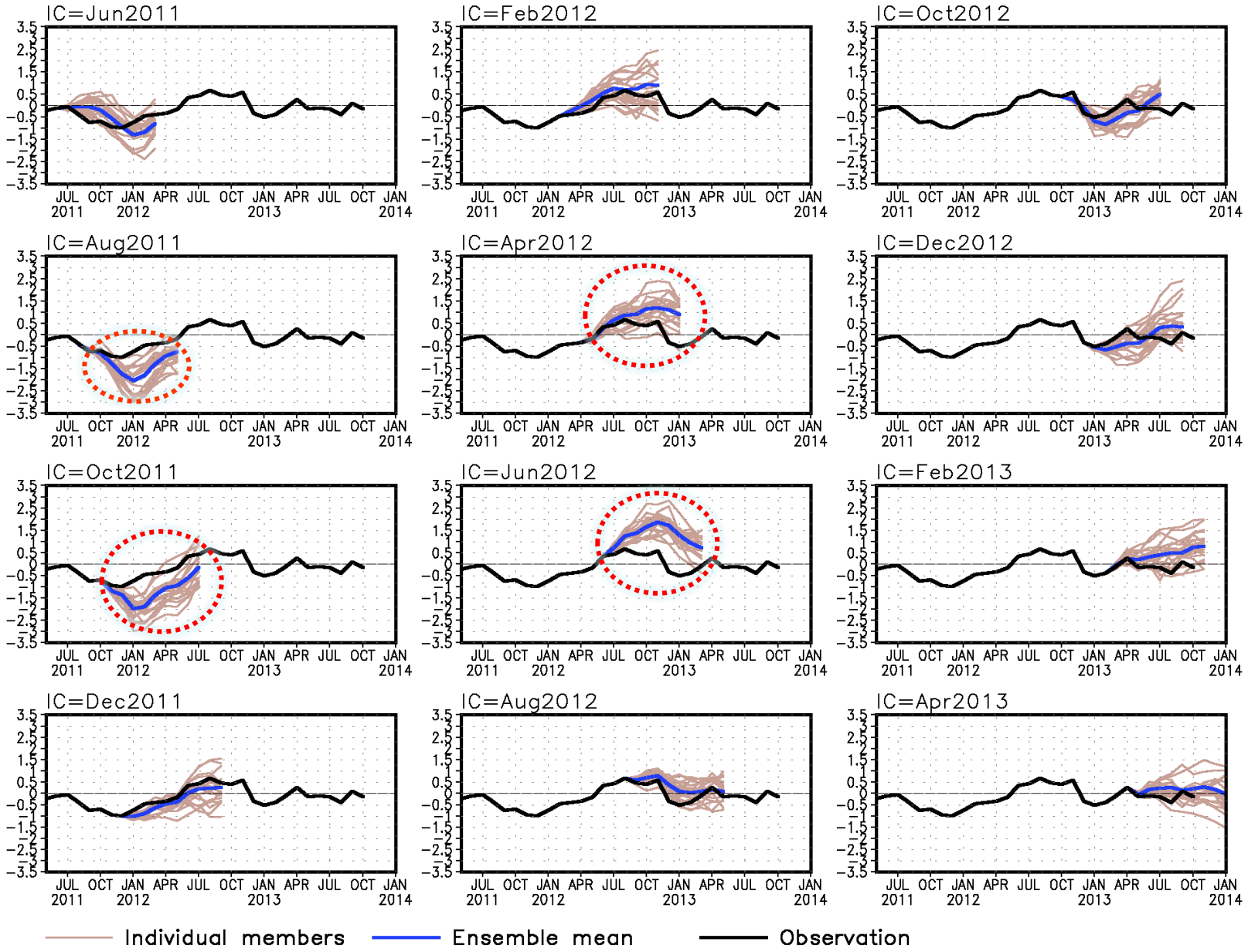






Individual members — Ensemble mean — Observation

CFSv2 Nino34 SST raw anomalies



Statistical correction

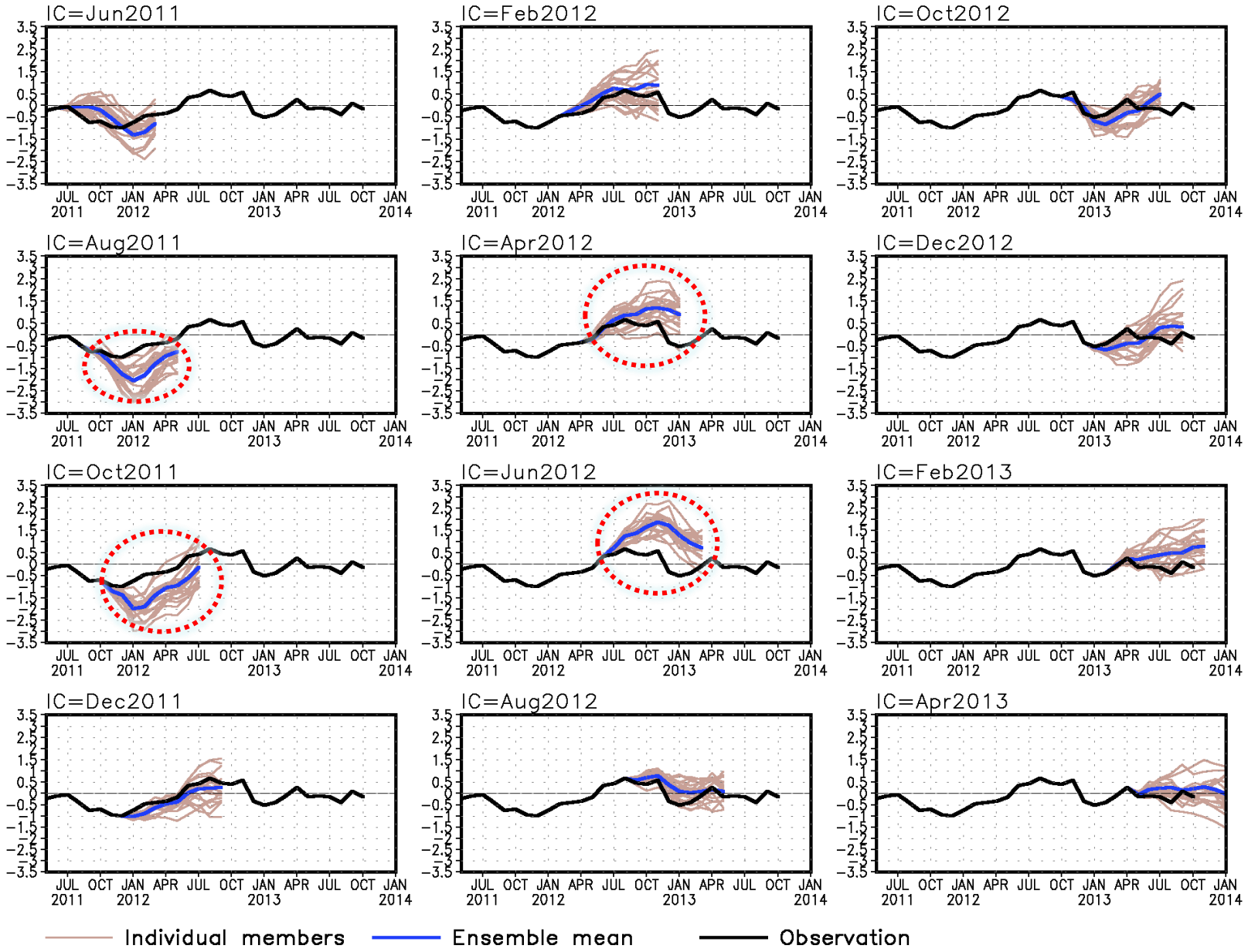
1. Amplitude correction (AMPC)

   $f_a' = f_a * \sigma_o / \sigma_f$

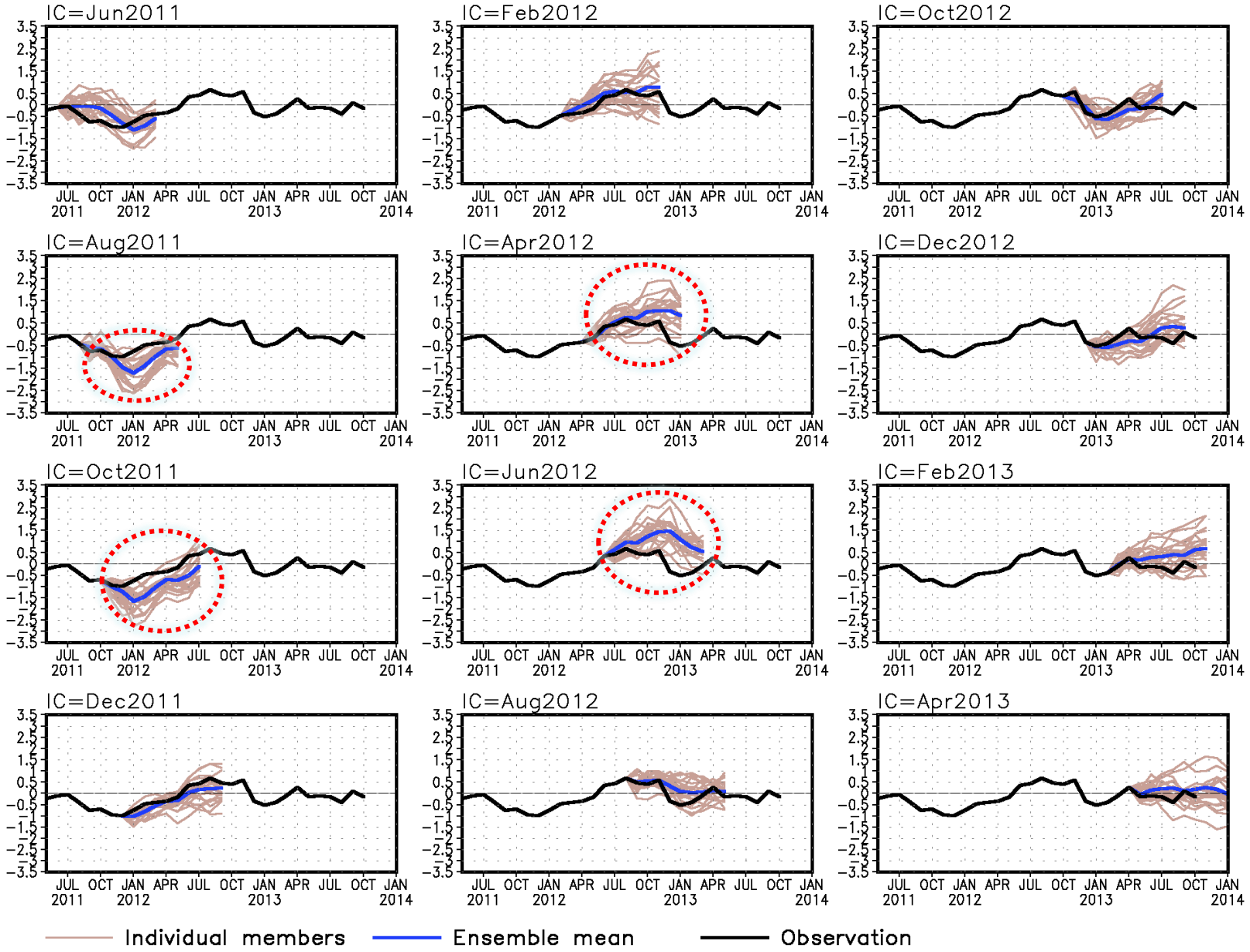
2. Probability Density Function Correction (PDFC)

   f_a' = Cumulative PDF mapping between forecast and observation

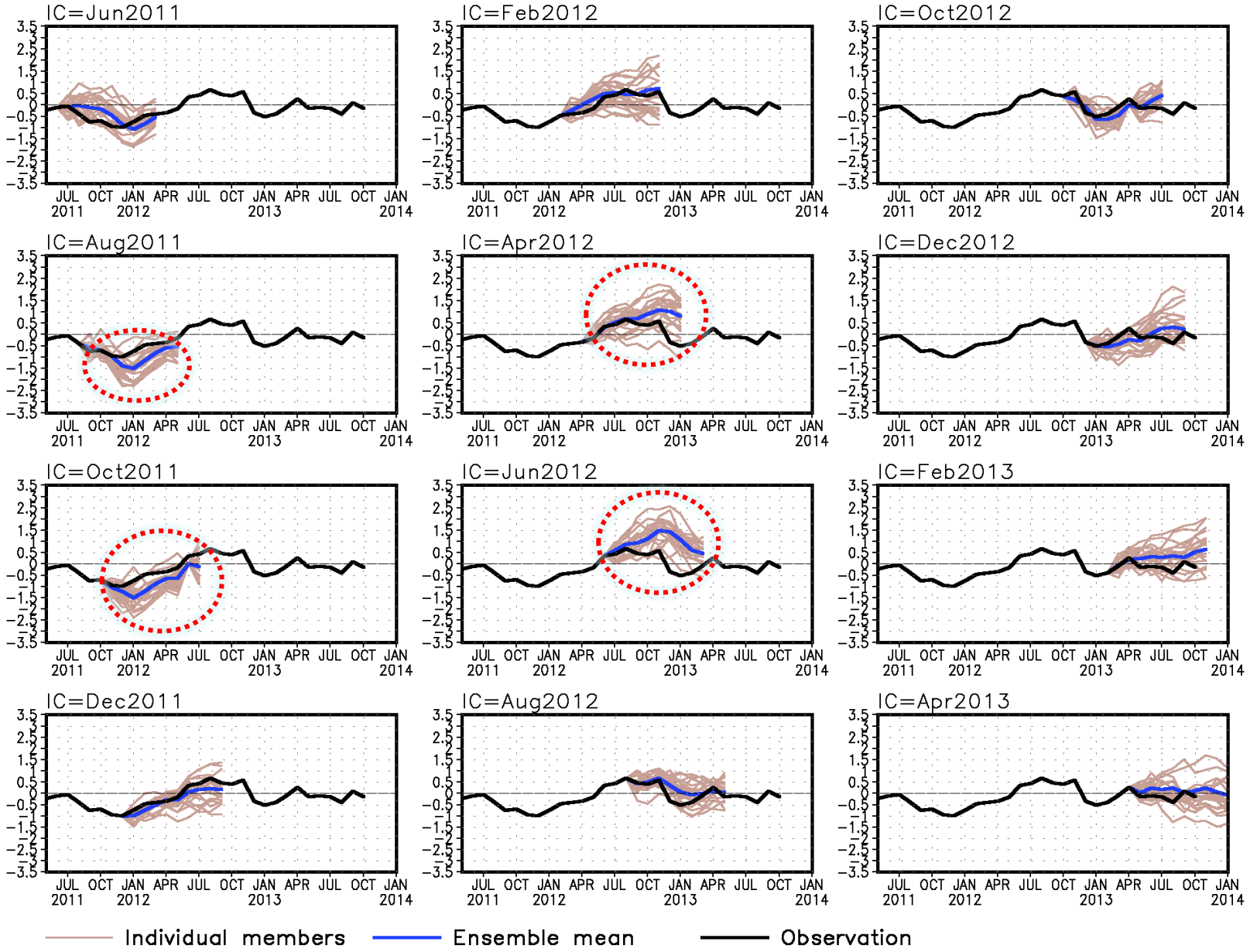
CFSv2 Nino34 SST raw anomalies



CFSv2 Nino34 SST with AMPC



CFSv2 Nino34 SST with PDFC

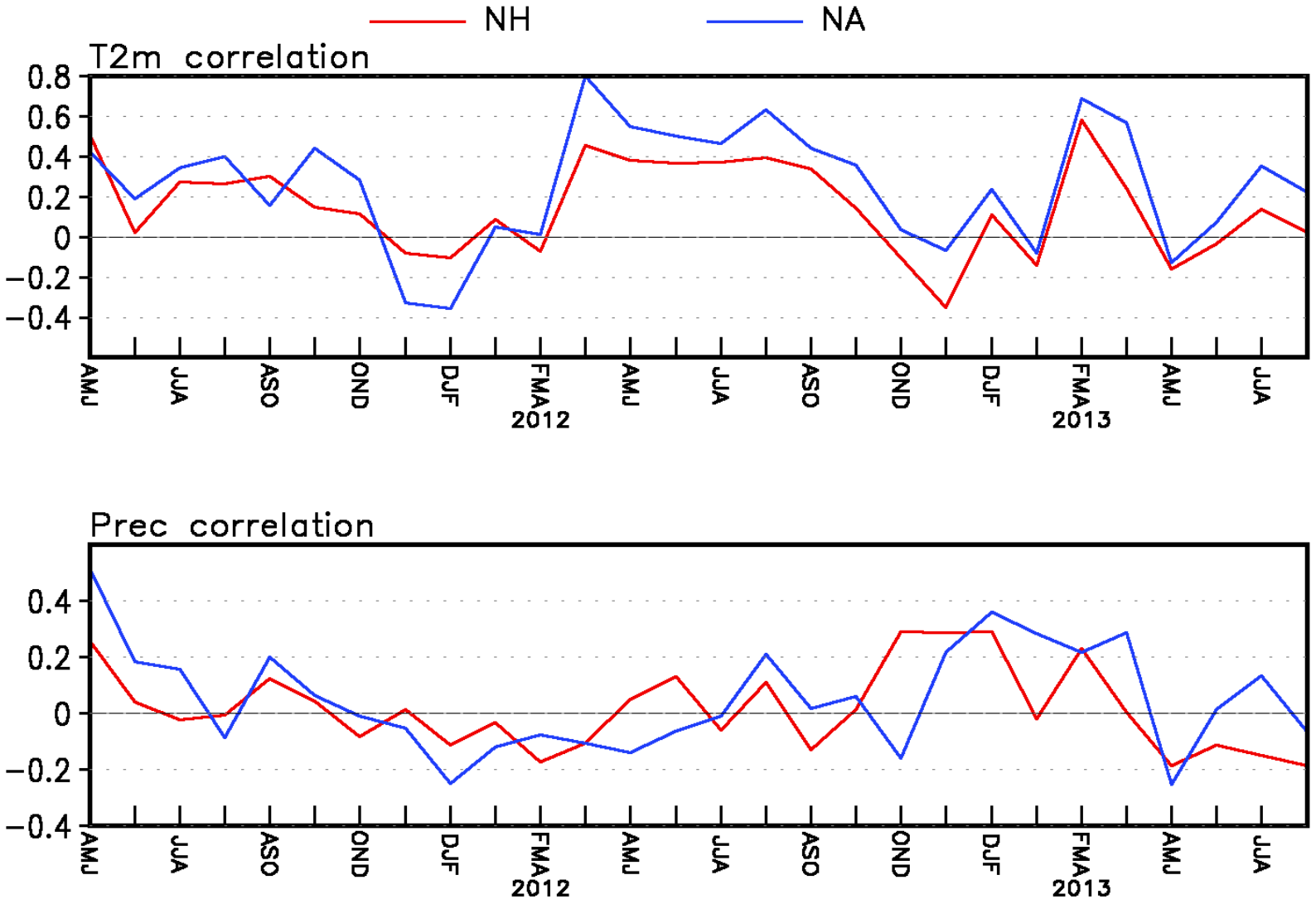


2. Northern Hemisphere T2m and precipitation

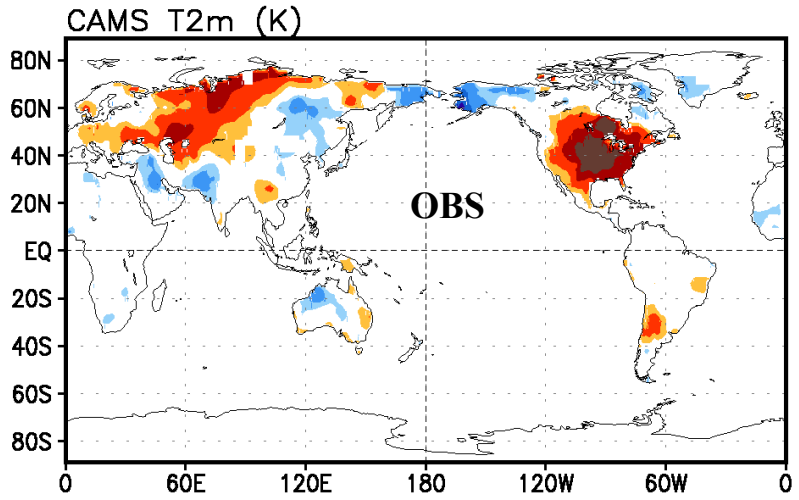
Pattern correlation over Northern Hemisphere

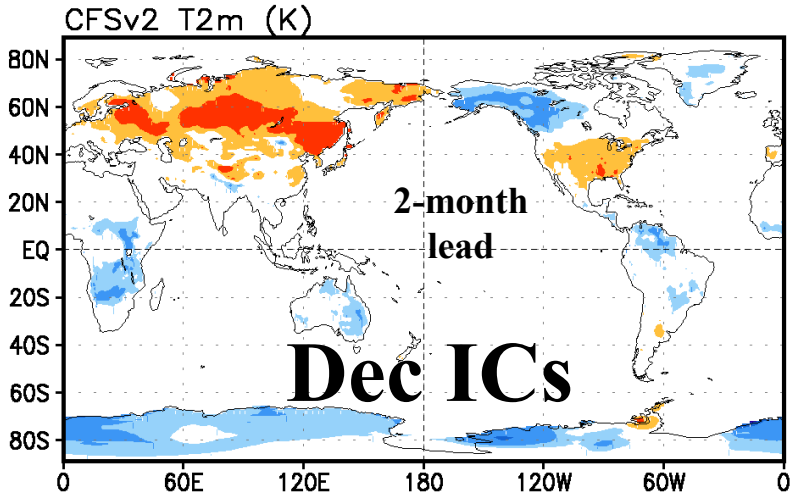
20N-80N

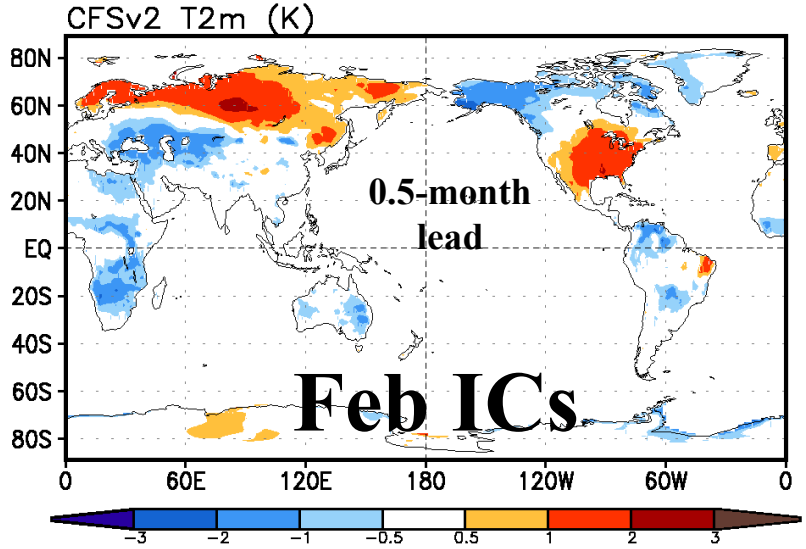
0.5-month lead

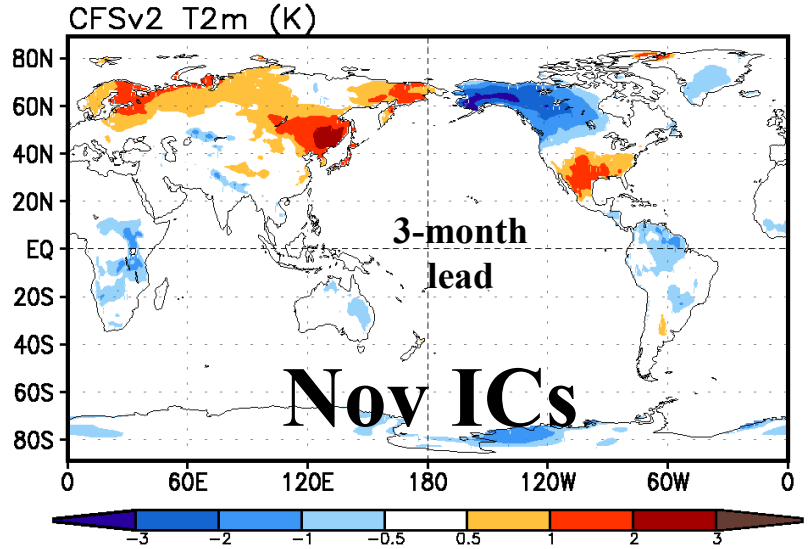


MAM 2012 T2m

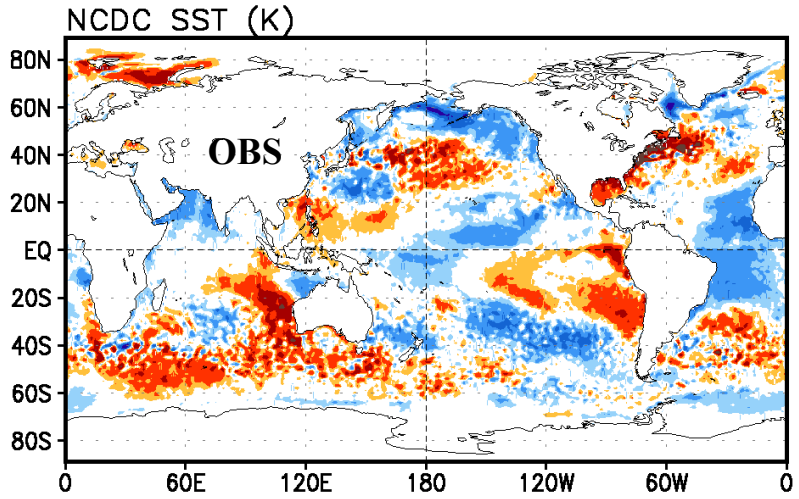

CAMS T2m (K)
OBS
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0

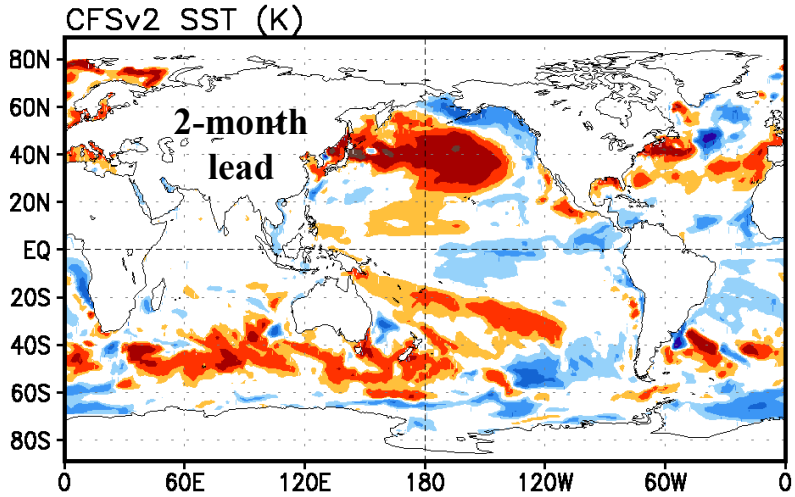

CFSv2 T2m (K)
2-month
lead
Dec ICs
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0

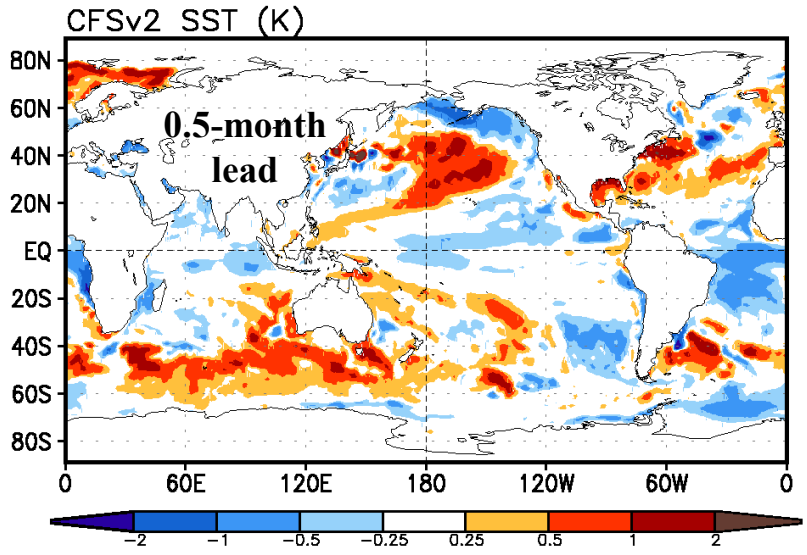

CFSv2 T2m (K)
0.5-month
lead
Feb ICs
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0
−3
−2
−1
−0.5
0.5
1
2
3

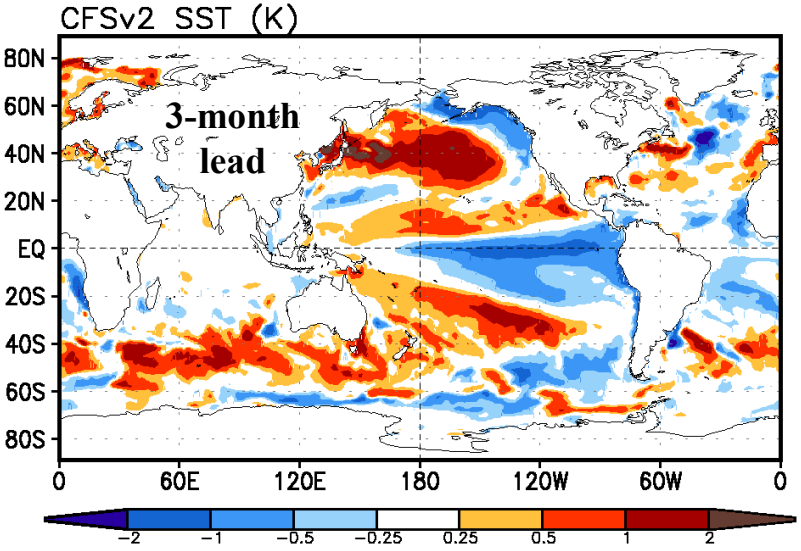

CFSv2 T2m (K)
3-month
lead
Nov ICs
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0
−3
−2
−1
−0.5
0.5
1
2
3

MAM 2012 SST

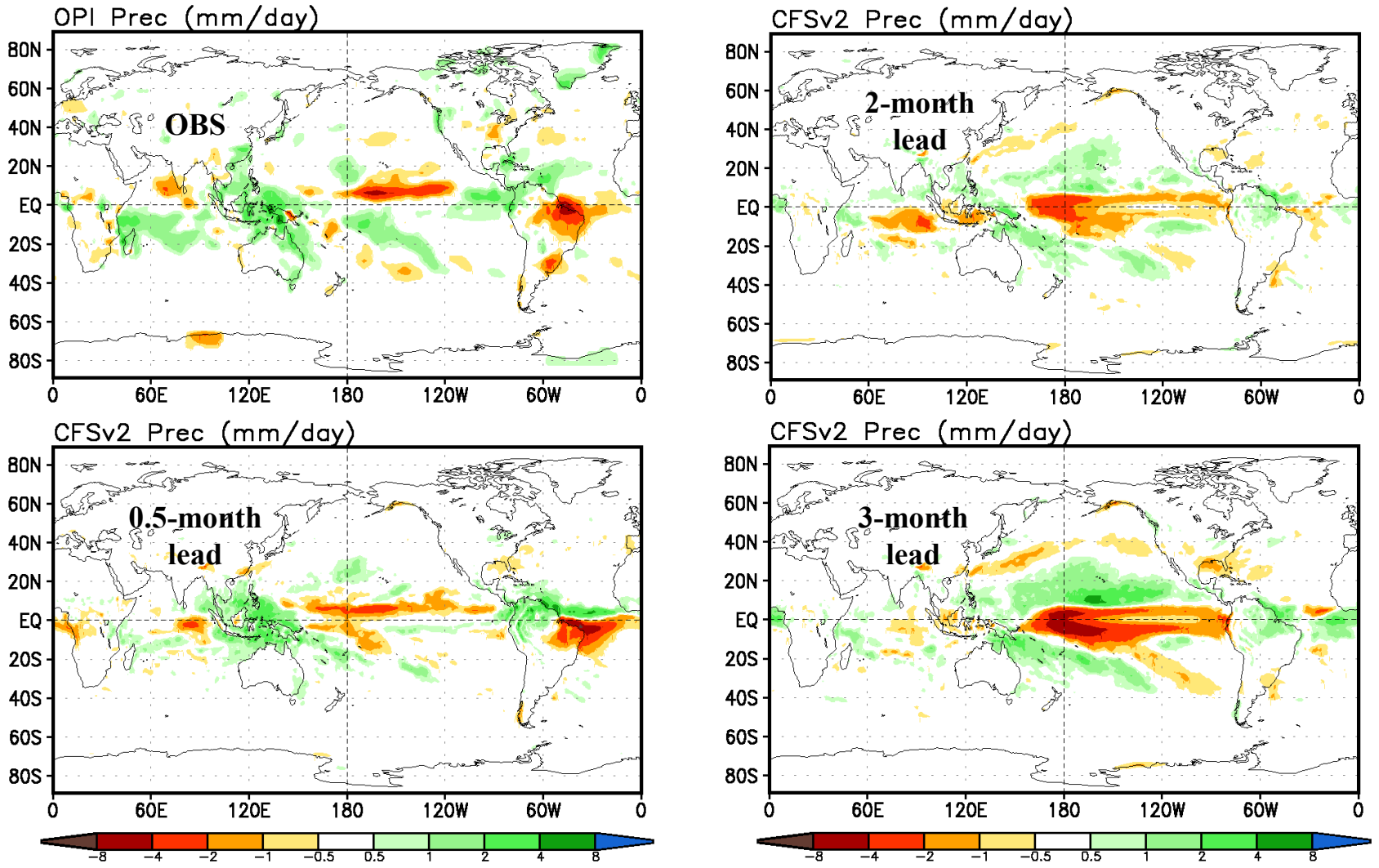

NCDC SST (K)
OBS
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0


CFSv2 SST (K)
2-month
lead
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0


CFSv2 SST (K)
0.5-month
lead
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0
−2
−1
−0.5
−0.25
0.25
0.5
1
2


CFSv2 SST (K)
3-month
lead
80N
60N
40N
20N
EQ
20S
40S
60S
80S
0
60E
120E
180
120W
60W
0
−2
−1
−0.5
−0.25
0.25
0.5
1
2

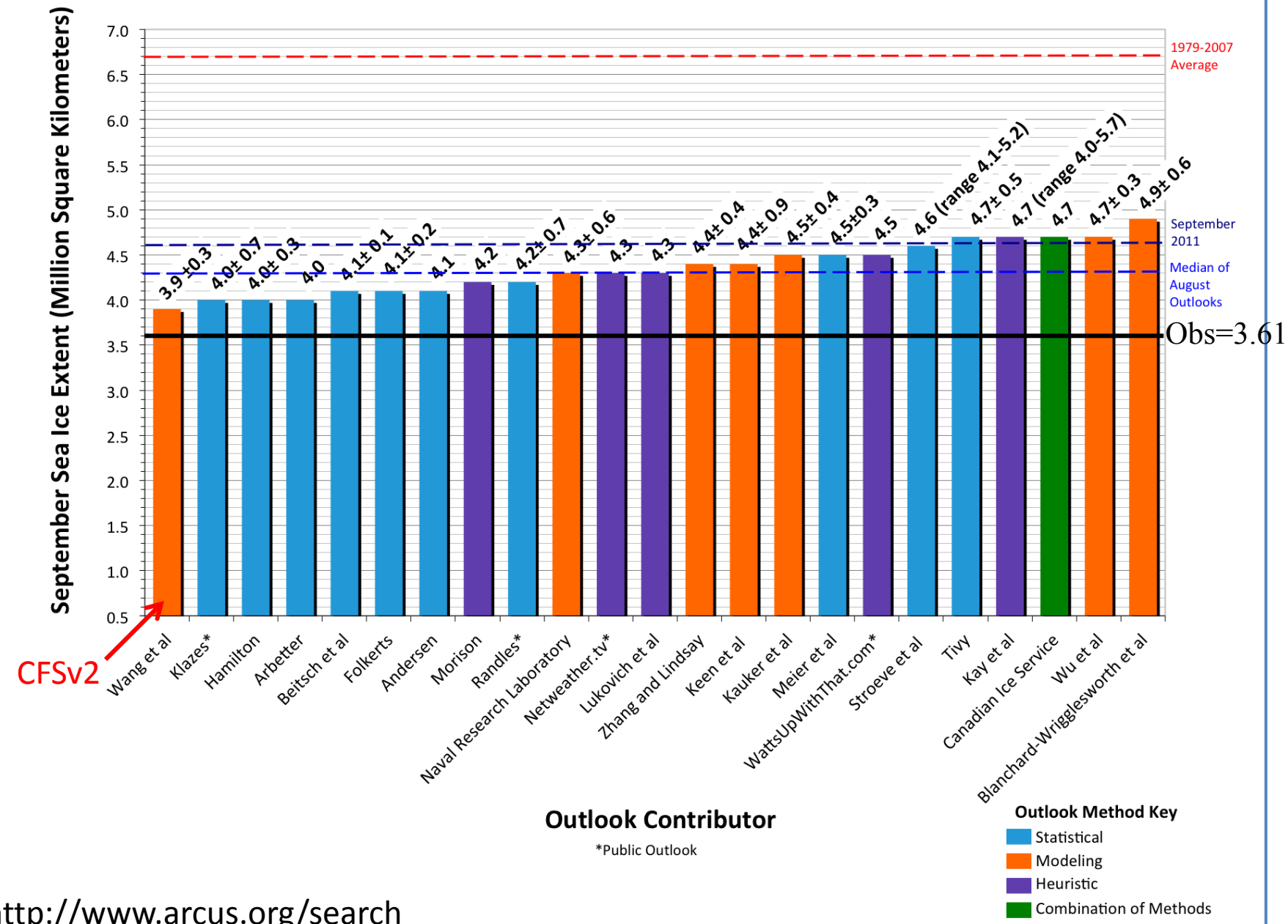
MAM 2012 Precipitation



3. Artic September sea ice extent

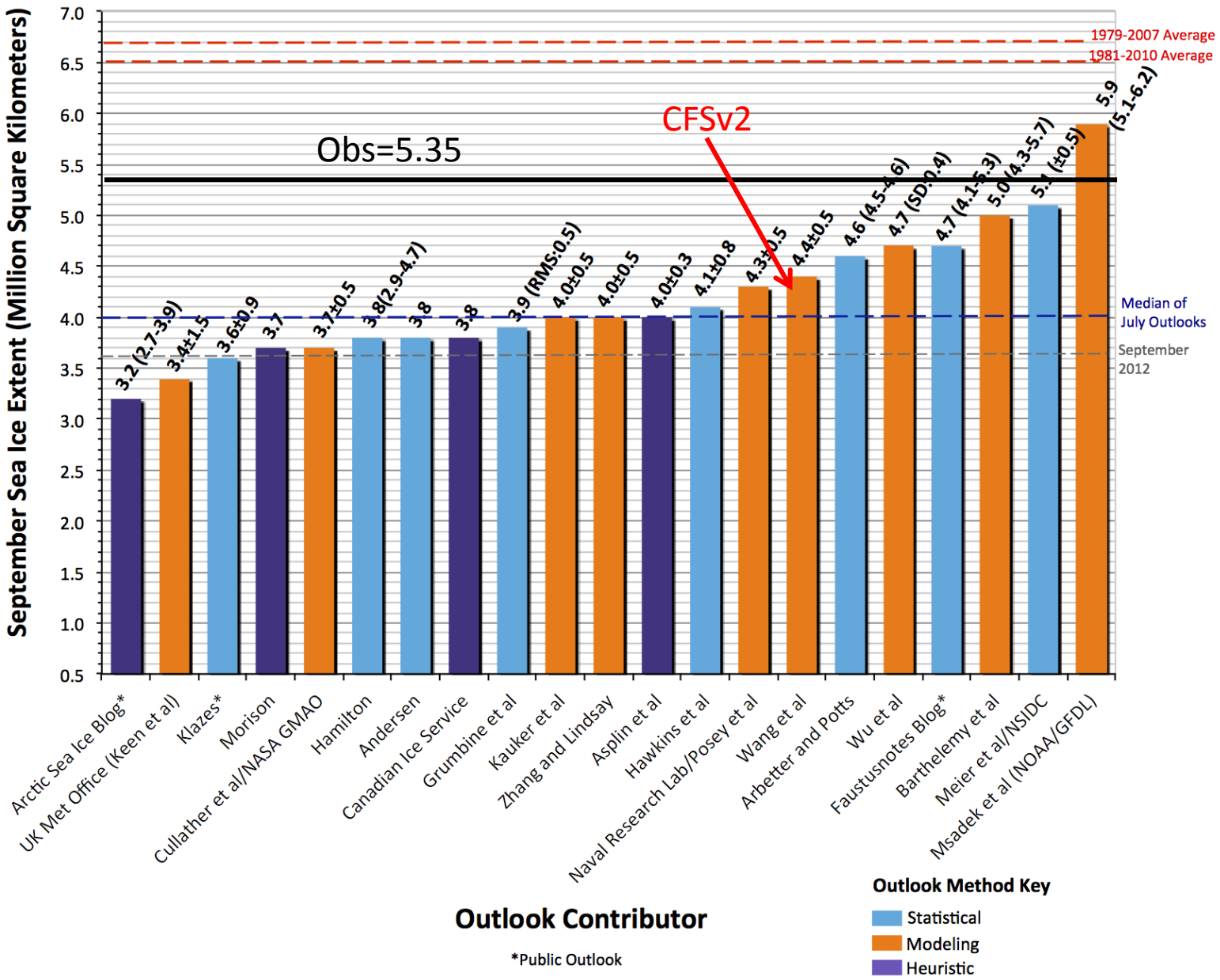
SEARCH

2012 Sea Ice Outlook: August Report

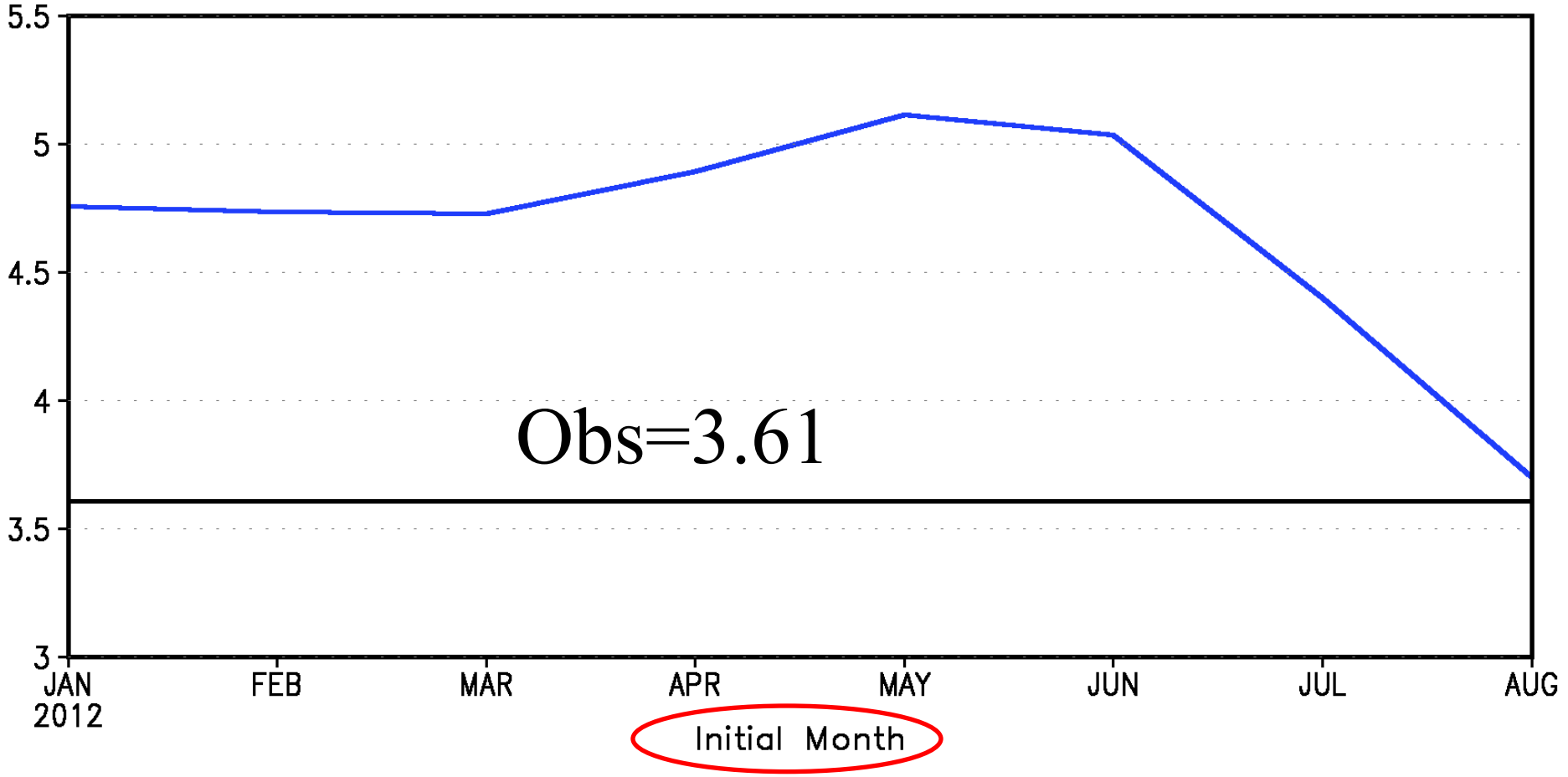


http://www.arcus.org/search

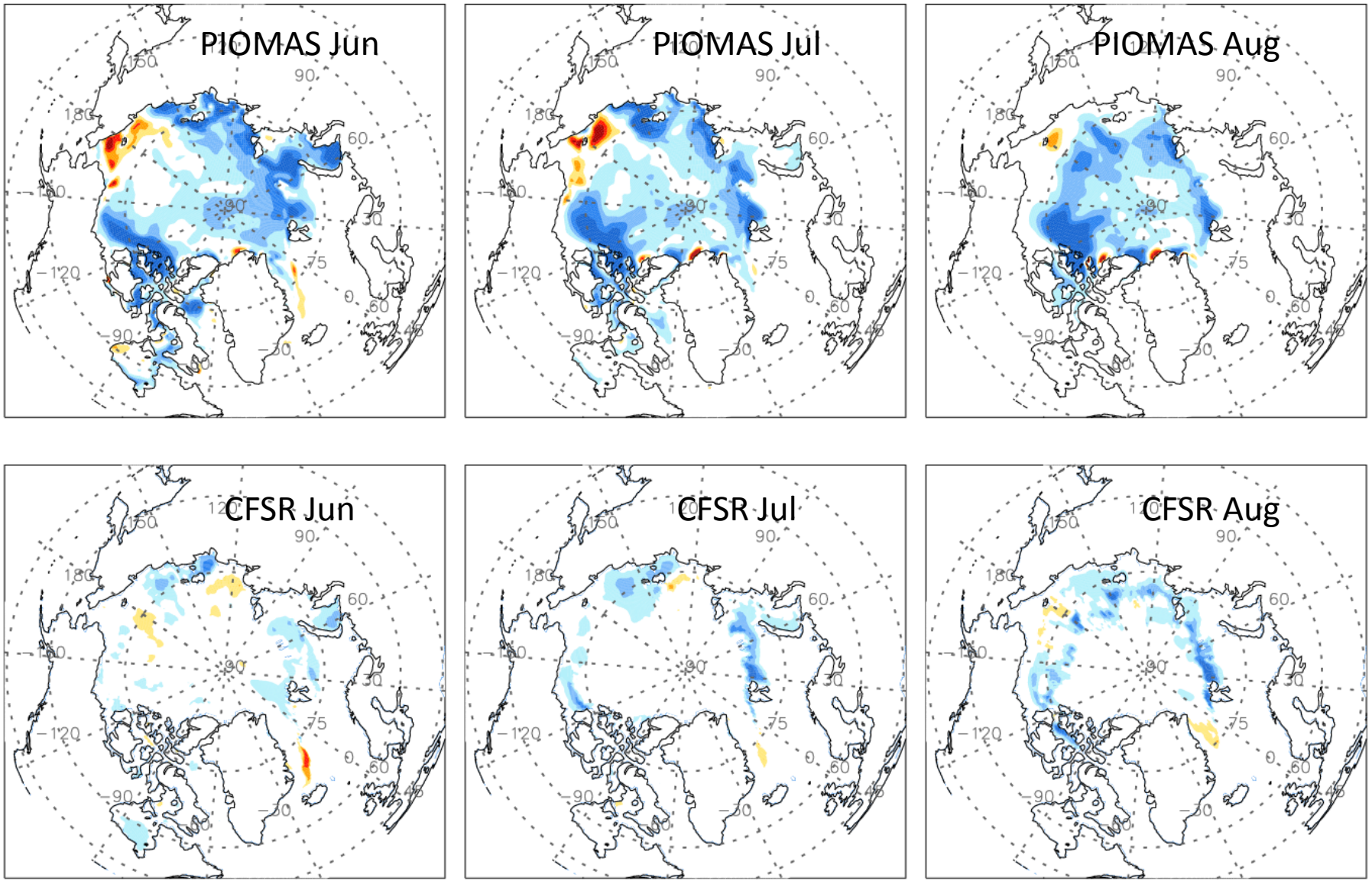
2013 Sea Ice Outlook: July Report



CFSv2 predicted sea ice extent **for September 2012** (10^6 km^2)



2012 SITh Anomalies from 2008-2011



Summary

- CFSv2 tends to predict stronger amplitude for both La Nina and El Nino events. Statistical corrections improve both ensemble mean and spread.

- Long-lead seasonal prediction of T2m during 2012 spring was successful although the predicted tropical SST pattern varied with lead time.

- CFSv2 is better than many other tools in predicting recent Arctic summer sea ice extent minimum. Initialization of more accurate sea ice thickness is highly desired for further improvement.